

What is claimed is:

1. System for controlling idle speed of an internal combustion engine, the system comprising:

an engine speed sensor producing an engine speed signal indicative of a rotational engine speed of an internal combustion engine; and

a control circuit controlling said rotational speed of said engine between an idle speed reference and a maximum speed reference, said control circuit modifying said idle speed reference as a function of said engine speed.

2. The system of claim 1 wherein said control circuit increases said idle speed reference from a first idle speed value to a second higher idle speed value as a function of said engine speed signal.

3. The system of claim 2 wherein said control circuit increases said idle speed reference to said second idle speed value if said engine speed signal indicates a rotational engine speed greater than a threshold engine speed value for at least a first predefined time period.

4. The system of claim 3 wherein said control circuit increases said idle speed reference to said second idle speed value if said engine speed signal indicates a rotational engine speed less than said threshold engine speed subsequent to indicating for at least said first predefined time period a rotational engine speed greater than said threshold engine speed.

5. The system of claim 4 wherein said control circuit decreases said idle speed reference from said second idle speed value to said first idle speed upon the expiration of a second predefined time period.

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6. The system of claim 5 wherein said control circuit decreases said idle speed reference from the second idle speed value to the first idle speed at a predetermined rate.

7. The system of claim 1 wherein said control circuit includes an engine speed control strategy, said engine speed control strategy comprising:

means for generating a reference engine speed as a function of a torque request;

means for generating said idle speed reference;

means for generating said maximum speed reference; and

a speed governor configured to control said rotational engine speed of said engine between said idle speed reference and said maximum speed reference, said means for generating said idle speed reference responsive to said engine speed to modify said idle speed reference.

8. A method of controlling minimum rotational speed of an internal combustion engine, the method comprising the steps of:

determining rotational engine speed of an internal combustion engine;

determining an engine acceleration rate as a function of said rotational engine speed of said engine; and

controlling a minimum rotational speed of said engine as a function of said rotational engine speed of said engine and said engine acceleration rate.

9. The method of claim 8 wherein controlling said minimum rotational speed of said engine includes increasing said minimum rotational speed from a first speed value to a second higher speed value if said rotational engine speed is greater than a threshold speed value and said engine acceleration rate is less than a predefined engine acceleration rate.

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10. The method of claim 9 wherein controlling said minimum rotational speed of said engine includes increasing said minimum rotational speed from said first speed value to said second higher speed value if said rotational engine speed is greater than said threshold speed value for at least a first predefined time period.

11. The method of claim 10 wherein controlling said minimum rotational speed of said engine includes decreasing said minimum rotational speed from said second speed value to said first speed value upon the expiration of a second predefined time period.

12. The method of claim 11 wherein controlling said minimum rotational speed of said engine includes decreasing said minimum rotational speed from said second speed value to said first speed value at a predetermined rate.

13. System for controlling idle speed of an internal combustion engine, the system comprising:

an engine speed sensor producing an engine speed signal indicative of rotational speed of an internal combustion engine; and

a control circuit controlling said rotational speed of said engine between an idle speed reference and a maximum speed reference, said control circuit temporarily increasing said idle speed reference from a first idle speed value to a second higher idle speed value if said engine speed signal drops from a threshold rotational speed value.

14. The system of claim 13 wherein said control circuit is increases said idle speed reference from said first idle speed value to said second idle speed value for a predefined time period.

15. The system of claim 14 wherein said control circuit returns said idle speed

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reference to said first idle speed value upon expiration of said predefined time period.

16. A method of controlling idle speed of an internal combustion engine, the method comprising the steps of:

determining a rotational speed of an internal combustion engine;

controlling said rotational speed of said engine between an idle speed reference and a maximum speed reference; and

temporarily increasing said idle speed reference from a first idle speed value to a second greater idle speed value if said rotational speed drops from above a threshold rotational speed value to below said threshold rotational speed value.

17. The method of claim 16 wherein temporarily increasing said idle speed reference includes increasing said idle speed reference from said first idle speed value to said second idle speed value if said rotational speed is greater than said threshold rotational speed value for at least a first predefined time period.

18. The method of claim 17 wherein temporarily increasing said idle speed reference includes decreasing said idle speed reference from said second idle speed value to said first idle speed value upon the expiration of a second predefined time period.

19. The method of claim 18 wherein temporarily increasing said idle speed reference includes decreasing said idle speed reference from said second idle speed value to said first idle speed value at a predetermined rate.

20. The system of claim 19 wherein said first predefined time period is approximately ten seconds and said second predefined time period is approximately four seconds.

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